

## CLAIMS

1. A junction field-effect transistor (20) comprising:

a first conductivity type semiconductor layer (1) having a channel region;

5 a buffer layer (3) formed on said channel region; and

a second conductivity type doped region (4a, 4b) formed on said buffer layer (3),

wherein

a first conductivity type carrier concentration in said buffer layer (3) is lower

than a first conductivity type carrier concentration in said first conductivity type

10 semiconductor layer (1).

2. The junction field effect transistor (20) according to claim 1, wherein said first

conductivity type carrier concentration in said buffer layer (3) is not more than one tenth

of said first conductivity type carrier concentration in said first conductivity type

15 semiconductor layer (1).

3. The junction field-effect transistor (20) according to claim 1, wherein said first

conductivity type semiconductor layer (1) is composed of silicon carbide.

20 4. The junction field-effect transistor (20) according to claim 1, further comprising a

second conductivity type semiconductor layer (5a, 5b) formed under said channel region.

5. The junction field-effect transistor (20a) according to claim 4, wherein said second  
conductivity type semiconductor layer (5a, 5b) is formed by implanting dopant ions,

25 the junction field-effect transistor further comprises another buffer layer (18)

formed under said channel region on said second conductivity type semiconductor layer,

a first conductivity type carrier concentration in said another buffer layer (18) is

lower than the first conductivity type carrier concentration in said first conductivity type

semiconductor layer (1).

5 6. The junction field-effect transistor (20a) according to claim 5, wherein said first conductivity type carrier concentration in said another buffer layer (18) is not more than one tenth of said first conductivity type carrier concentration in said first conductivity type semiconductor layer (1).

10 7. The junction field-effect transistor (20) according to claim 1, further comprising a semiconductor substrate (6) composed of n-type silicon carbide, wherein said first conductivity type semiconductor layer (1) is formed on one main surface of said semiconductor substrate (6).

15 8. The junction field-effect transistor (21) according to claim 7, further comprising:  
a gate electrode (11a, 11b) formed on the surface of said second conductivity type doped region (4a, 4b),  
an electrode (13a, 13b), either a source electrode or a drain electrode, formed on the surface of said first conductivity type semiconductor layer (1), and  
another electrode (15), either a drain electrode or a source electrode, formed on another main surface of said semiconductor substrate (6).

20 9. The junction field-effect transistor (21) according to claim 7, further comprising:  
a gate electrode (11) formed on the surface of said second conductivity type doped region (4a), and  
a source electrode (13) and a drain electrode (15) formed on the surface of said  
25 first conductivity type semiconductor layer (1).